

**FOOD PLANTS OF THE PEA LEAF WEEVIL *SITONA LINEATUS*
(LINNAEUS) (COLEOPTERA: CURCULIONIDAE) IN NORTHERN
IDAHO AND EASTERN WASHINGTON¹**

J. R. FISHER

Northern Grain Insects Research Laboratory, Agricultural Research, SEA,
USDA, Brookings, South Dakota 57006

AND

L. E. O'KEEFFE

Department of Entomology, University of Idaho, Moscow 83843

The exclusive host plants of *Sitona lineatus* (Linnaeus) are legumes. Its cultivated hosts in Europe are peas (*Pisum sativum*), broadbeans (*Vicia faba*), sweetclover (*Melilotus officinalis*), and lentils (*Lens culinaris*) (Jackson, 1920; Hans, 1959; Melamed-Madjar, 1966; and Sedivy, 1972). Because the pea leaf weevil is a new pest in the inland Pacific Northwest and appears to have a host range there that is somewhat different from that in Europe, additional information was needed about its food plants and host range. The purpose of this study was to: 1) survey and record the plants fed upon by adult *S. lineatus* in the inland Pacific Northwest pea growing region; and 2) determine the degree of feeding by the adults on legumes grown or occurring in the region.

Methods and Materials

Survey.—During 1973-1975 from early April until October, wild and cultivated legumes and other plant species in northern Idaho and eastern Washington were examined for presence of adult *S. lineatus* and evidence of feeding.

Feeding evaluation.—In the summer season of 1974 plots containing Austrian' winter peas, 'Alaska' spring peas, 'First and Best' peas, broadbeans, lentils, alfalfa (*Medicago sativa*), white clover (*Trifolium repens*), and red clover (*Trifolium pratense*) were planted at the University of Idaho Plant Science Farm at Moscow, Idaho; also, all the species except broadbeans were planted at the Washington State University Dairy Farm, Pullman, Washington. The experiment was repeated in the summer of 1975 at the Moscow location.

The plots were evaluated for feeding intensity at Moscow on August 13, 1974 and June 10 and August 5, 1975 and at Pullman on May 28, 1974 and August 13, 1974. Feeding was rated as heavy, moderate, occasional, or

Table 1. Food and host plants of *Sitona lineatus* found in northwest United States and inland Pacific Northwest pea growing regions.

| Scientific name | Common name | Food plant ¹ | | | Reference (North America) |
|---|---------------------|-------------------------|--------|---------------------|------------------------------|
| | | Spring | Summer | Late summer-fall | |
| Family Leguminosae | | | | | |
| <i>Pisum sativum</i> ³ | Pea | +++ | +++ | | Prescott and Reeher, 1961 |
| <i>Phaseolus vulgaris</i> | Bean | | + | + | Prescott and Reeher, 1961 |
| <i>Melilotus officinalis</i> ³ | Yellow sweetclover | +++ | +++ | +++ | |
| <i>Melilotus alba</i> ³ | White sweetclover | +++ | +++ | +++ | |
| <i>Trifolium pratense</i> ³ | Red clover | + | | ++ | |
| <i>Trifolium repens</i> ³ | White clover | +++ | | +++ | |
| <i>Trifolium hybridum</i> | Aslike clover | + | | ++ | |
| <i>Vicia faba</i> ³ | Broad bean | +++ | +++ | | |
| <i>Vicia hirsuta</i> | Hairy vetch | + | | ++ | |
| <i>Vicia americana</i> | American vetch | | ++ | ++ | |
| <i>Vicia sativa</i> | Common vetch | | | + | Webster et al., 1942 |
| <i>Vicia villosa</i> ² | Woodypod vetch | | | + | Anon., 1967 |
| <i>Lotus corniculatus</i> | Bird's foot trefoil | + | | ++ | Prescott and Reeher, 1961 |
| <i>Lathyrus latifolius</i> | Perennial sweet pea | + | | + | |
| <i>Caragana</i> spp. | Siberian pea shrub | | | ++ | |
| <i>Robinia pseudoacacia</i> | Black locust | | | ++ | |
| <i>Medicago sativa</i> ³ | Alfalfa | +++ | | +++ | Prescott and Reeher, 1961 |
| <i>Medicago lupulina</i> | Black medic | | | ++ | |

Table 1. Continued.

| Scientific name | Common name | Food plant ¹ | | | Reference (North America) |
|-------------------------------|--------------------|-------------------------|--------|---------------------|------------------------------|
| | | Spring | Summer | Late summer–fall | |
| Family Rosaceae | | | | | |
| <i>Rosa</i> spp. | Rose | | | + | Prescott and Reeher, 1961 |
| <i>Fragaria</i> spp. | Strawberries | | | + | Prescott and Reeher, 1961 |
| <i>Rubus</i> spp. | Blackberries | | | + | Prescott and Reeher, 1961 |
| <i>Pyrus</i> spp. | Apples, pears | | | + | Prescott and Reeher, 1961 |
| Family Polygonaceae | | | | | |
| <i>Polygonum aviculare</i> | Prostrate knotweed | | | +++ | Prescott and Reeher, 1961 |
| Family Amaranthaceae | | | | | |
| <i>Amaranthus retroflexus</i> | Redroot pigweed | | | ++ | |

¹ + = occasional feeding.
++ = moderate feeding.
+++ = heavy feeding.
² Not found in this study.
³ Known host plant.

Table 2. Intensity of feeding on selected legumes by adult *Sitona lineatus* for plots (A) in the late summer of 1974 and 1975 and the spring of 1975 at Moscow, Idaho and (B) in the spring and late summer of 1974 at Pullman, Washington.¹

| Legume | A. Moscow, Idaho | | | B. Pullman, Washington | |
|----------------------|------------------|---------------|--------------|------------------------|---------------|
| | Aug. 13, 1974 | June 10, 1975 | Aug. 5, 1975 | May 28, 1974 | Aug. 13, 1974 |
| Broad beans | | +++ | | | |
| Alaska spring peas | | +++ | | ++ | |
| First and best peas | | +++ | | ++ | |
| Austrian winter peas | | +++ | | +++ | |
| Lentils | | | | | |
| Alfalfa | ++ | + | +++ | ++ | ++ |
| White clover | +++ | ++ | ++ | +++ | +++ |
| Red clover | ++ | + | ++ | ++ | ++ |

¹ Notation same as Table 1.

absent. Since the weevils cause damage to plants by chewing conspicuous sub-circular notches in the leaves, damage will vary from occasional notching to complete defoliation. A score of occasional indicated an average of at least one notch per plant but not more than one per leaf. A score of moderate indicated an average of at least 2 notches per leaf but not more than 4 per leaf. A score of heavy indicated at least five notches per leaf. Thirty plants of each crop were evaluated, and the score for the majority of the 30 plants was taken as the degree of feeding intensity for that crop. Only the perennial forage legumes and lentils were reevaluated in August since by then the annual legumes (peas and broadbeans) had reached maturity.

Results and Discussion

Food and host plants of *S. lineatus* have been noted in almost every report on the biology of this insect since that of Curtis (1860). Nevertheless, a number of the plant species reported here as food plants are new records for North America.

Feeding on the greatest variety of plant species occurred during the fall or early spring (Table 1). Only a few species (peas, sweetclover, and broadbeans) were heavily fed upon during the summer. In the feeding evaluation plots, annual legumes (peas and broadbeans) tended to have heavier feeding in the late spring (May–June) and perennial legumes (alfalfa, white clover and red clover) were fed upon in the late summer (August) (Table 2). Among the perennials, white clover had the heaviest feeding and alfalfa and red clover had moderate feeding. Lentils were not fed upon at any time.

Laboratory studies in Germany with leaf discs of 304 plant species of dicotyledons have shown that *S. lineatus* fed on 102 species, most belonging to the orders Fabales and Rosales; however, little or no feeding on other plant species occurred when *Pisum sativum*, *Vicia faba*, or *V. sativa* were present (Greib and Klingauf, 1977). Feeding on plants other than known host plants in the Pacific Northwest appeared to indicate a drastic need for sustenance. The majority of host plants (annual legumes) in the inland Northwest are present only in late spring and summer. Therefore, other plants must be used for food. *S. lineatus* is normally active at temperatures above 4.5°C (Hans, 1959). Even though temperatures may reach 4.5°C or more in late March and April, the overwintering adults are confined to movement on foot and to the overwintering sites in perennials until they can migrate in flight to annual legumes in late April and early May (Fisher, 1977). In northern Idaho and eastern Washington, annual legumes begin to senesce in late July and early August at the time when the new generation adults emerge. Since there is little green host plant material to feed upon and since the weevils do not migrate to the overwintering sites for some time (Fisher, 1977), any green plants in or close to the emergence sites may be used for food. Thus we observed feeding on redroot pigweed (*Amaranthus retroflexus*) in only one place in the pea growing region, a 0.1 hectare fallow field located between two spring pea fields. Likewise, other plant species, i.e. prostrate knotweed (*Polygonum aviculare*), rose (*Rosa* spp.), black medic (*Medicago lupulina*), black locust (*Robinia pseudo-acacia*) and Siberian pea shrub (*Caragana arborescens*), were fed upon in late summer and early fall.

Although many plant species were fed upon by *S. lineatus* in the inland Pacific Northwest, the weevils were never observed feeding on lentils in the field. In northern Idaho under field cage conditions lentils did not support development of *Sitona lineatus* (Fisher and O'Keeffe, 1978). Lentils have been reported to be a preferred host plant in Czechoslovakia (Sedivy, 1972). The inland northwest pea growing region is the only region in the United States where lentils are grown commercially in large acreages. *S. lineatus* was not found in the pea growing region until 1970 even though it had been found in the Pacific Northwest coastal areas as early as 1936 (Downes, 1938; and Anon., 1970). With the absence of lentils as a food plant for at least 34 generations (1936–70), the insect may have lost a preference for this crop. Also, the varieties of lentils used in Czechoslovakia have not been compared for *S. lineatus* feeding preference with the varieties used in this region.

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Footnote

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